

Rad-Hard Sigma-Delta 3-Channel ADC for Fluxgate Magnetometers, Phase II

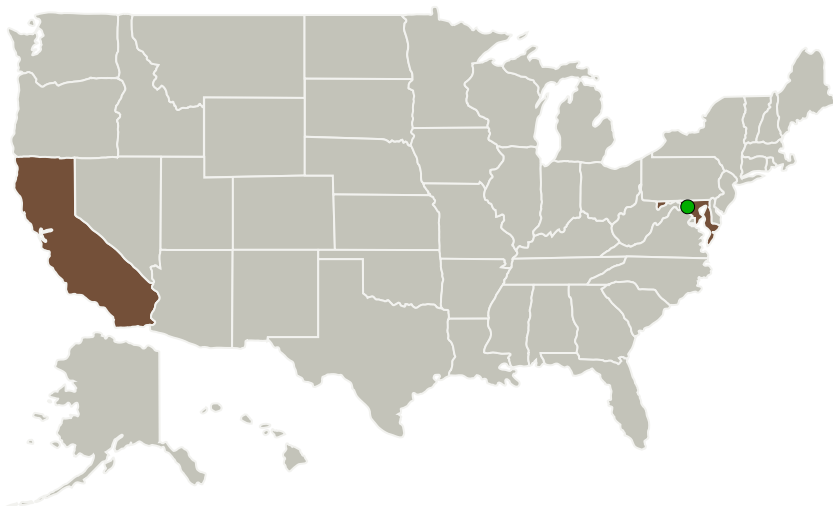
Completed Technology Project (2015 - 2018)



Project Introduction

The measurement of the magnetic field vector is of fundamental importance to space physics missions. The fluxgate magnetometer is a device developed for precise vector measurement of static magnetic fields. The high performance magnetometers are required in such NASA missions as ICON, GOLD, Solar Orbiter, Solar Probe Plus, ONEP, SEPAT, INCA, CISR, DGC, HMag and other planetary explorations. The analog-to-digital converter (ADC) is one of the critical components of the magnetometer. The performance of the magnetometer directly depends on the ADC's characteristics such as the resolution, accuracy, and conversion speed. The general requirements for all ADCs used in space missions are low power consumption, low area, and high radiation tolerance. Pacific Microchip Corp. proposes to develop a rad-hard ADC specifically targeted for application in Fluxgate Magnetometers. Phase I work provided a proof of feasibility, complete definition and validation based on extensive simulation and analysis of the proposed ADC. During Phase II the ADC design will be finished, the ADC will be fabricated, packaged and tested (including radiation hardness). At the end of Phase II a fieldable product will be produced. In order to facilitate the commercialization efforts in Phase III, the product will be fabricated using a commercial 180nm CMOS technology.

Primary U.S. Work Locations and Key Partners



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Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Images	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

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Completed Technology Project (2015 - 2018)



Organizations Performing Work	Role	Type	Location
Pacific Microchip Corporation	Lead Organization	Industry	Culver City, California
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Transitions

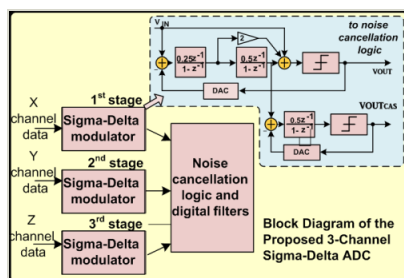
▶ **May 2015:** Project Start

✔ **December 2018:** Closed out

Closeout Documentation:

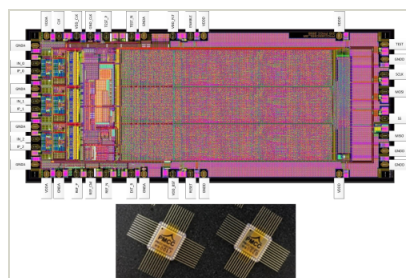
- Final Summary Chart(<https://techport.nasa.gov/file/137793>)

Images



Briefing Chart

Rad-Hard Sigma-Delta 3-Channel ADC for Fluxgate Magnetometers Briefing Chart
(<https://techport.nasa.gov/image/133224>)



Final Summary Chart Image

Rad-Hard Sigma-Delta 3-Channel ADC for Fluxgate Magnetometers, Phase II Project Image
(<https://techport.nasa.gov/image/128190>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Pacific Microchip Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

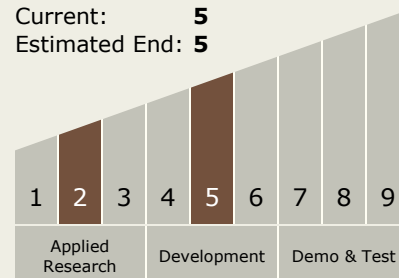
Carlos Torrez

Principal Investigator:

Dalius Baranauskas

Technology Maturity (TRL)

Start: 2
Current: 5
Estimated End: 5



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Technology Areas

Primary:

- TX02 Flight Computing and Avionics
 - └ TX02.1 Avionics Component Technologies
 - └ TX02.1.5 High Performance Field Programmable Gate Arrays

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System